

CLAIMS

1. A method of managing food supply in real time comprising:
electronically generating real time data about food consumers inside or in the vicinity of a food outlet; and
electronically predicting, based on said real time data, an amount of food to be ordered by said food consumers in a predetermined time interval immediately following said generation of said real time data.
2. The method of claim 1, wherein electronically generating said real time data includes at least one of the following:
placing a first plurality of sensors inside said food outlet to generate, in real time, a first information about potential food consumers inside said food outlet;
placing a second plurality of sensors around and in said food outlet to generate, in real time, a second information about automobile traffic flow external to said food outlet, and in the vicinity thereof, and human traffic flow external to said food outlet, inside the food outlet, and in the vicinity thereof; and
electronically analyzing said first and said second information in real time to generate said data about said food consumers;
wherein at least one of said first or said second plurality of sensors is a color based vision sensor.
3. The method of claim 2, wherein said color based vision sensor comprises a color enabled camera.
4. The method of claim 2, wherein at least one other of said first and said second plurality of sensors is one of an electrical sensor; a mechanical sensor; and a chemical sensor.
5. The method of claim 4, wherein said electrical sensor is one of a magnetic loop

sensor; a laser beam switch; and a camera, wherein said camera comprises either a color based vision camera or a black and white vision based camera.

6. The method of claim 4, wherein said mechanical sensor is one of a piezo-electric switch; and a pneumatic pressure switch.
7. The method of claim 4, wherein said chemical sensor is a device that measures changes in CO (carbon monoxide) emissions.
8. The method of claim 2, wherein said first information includes indications of one or more of the following:
 - whether said potential food consumers are present inside said food outlet;
 - a total number of said potential food consumers inside said food outlet;
 - a direction of motion of one or more of said potential food consumers;
 - whether one or more of said potential food consumers are placing food orders;
 - a food ordering pattern of each of said potential food consumers that is placing a food order;
 - a color or color distribution associated with each of said potential food consumers; and
 - how long it takes for an employee of said food outlet to receive said food order.
9. The method of claim 2, wherein said second information includes indications of one or more of the following:
 - direction of movement of said human and said automobile traffic flow including:
 - whether one or more humans in said human traffic are entering or exiting the property of said food outlet, and
 - whether one or more vehicles in said automobile traffic are entering or exiting the property of said food outlet;
 - a total number of human food consumers entering and exiting said food outlet;
 - a total number of vehicles constituting said automobile traffic;
 - whether said human and automobile traffic is present on the property of said food

outlet;

whether one or more vehicles in said automobile traffic are entering or exiting a drive-thru food order lane on the property of said food outlet; and
a total number of vehicles entering or exiting said drive-thru lane.

10. The method of claim 2, wherein said real time data includes one or more of the following:
 - a first amount of time that it takes, on average, for one of said potential food consumers to wait prior to placing a food order;
 - a first number of potential food consumers inside said food outlet;
 - a second number of vehicles on the property of said food outlet;
 - a third number of automobiles in a drive-thru food order lane on the property of said food outlet;
 - a second amount of time that it takes, on average, for an automobile to remain in said drive-thru lane prior to arriving at a drive-thru ordering window;
 - a third information about a corresponding ordering pattern of each food consumer present inside said food outlet or in said drive-thru lane;
 - for each food consumer entering said food outlet, a corresponding fourth amount of time that it takes for each said human food consumer to walk to a food order panel inside said food outlet after entering the property of said food outlet; and
 - for each food order received, a corresponding fifth amount of time that it takes for an employee of said food outlet to receive each said food order.
11. The method of claim 2, wherein electronically analyzing said first and said second information includes electronically performing at least one of the following in real time:
 - processing said second information to identify and count vehicles constituting said automobile traffic external to and in the vicinity of said food outlet;
 - further processing said second information to identify and count vehicles present in a drive-thru food order lane on the property of said food outlet; and

processing said first and said second information to identify, count and differentiate between humans inside and in the vicinity of said food outlet.

12. The method of claim 2, wherein electronically predicting said amount of food to be ordered includes electronically performing the following in real time:
selecting one or more queuing models from a plurality of queuing models;
inputting relevant portions of said real time data into respective one or more
queuing models selected; and
simulating each of said one or more queuing models after inputting said relevant portions of said real time data thereinto.
13. The method of claim 12, where said plurality of queuing models includes a zero queue model; a single queue model; a single queue, multiple station model; and a multi queue model.
14. The method of claim 2, further comprising electronically performing at least one of the following in real time:
estimating impending food product demand in view of said prediction of said
amount of food to be ordered by said food consumers; and
estimating demand for each completed food product available for consumption.
15. The method of claim 14, wherein estimating impending food product demand includes electronically performing at least one of the following:
estimating a desired nominal component buffer level, wherein said component
buffer level includes a plurality of bins of food product components;
estimating remaining time for each of said plurality of bins before each said bin
runs out of corresponding food product components; and
estimating time required to fill one of said plurality of bins with corresponding
food product components when said bin becomes empty.
16. The method of claim 14, wherein estimating impending food product demand

includes displaying estimated food product demand on a display terminal.

17. The method of claim 14, wherein estimating demand for each completed food product includes estimating said demand for each said completed food product using a food production data input received from an employee of said food outlet.
18. The method of claim 2, wherein electronically generating real time data includes electronically tracking objects present inside or in the vicinity of said food outlet to identify presence of said food consumers and to count a number of said food consumers present inside or in the vicinity of said food outlet.
19. A method of managing food production and delivery in real time comprising:
electronically predicting, based on real time data, an amount of food to be ordered
at a food outlet in a specified time interval immediately succeeding a
generation of said real time data;
preparing said amount of food predicted to be ordered; and
serving prepared food to patrons of said food outlet.
19. The method of claim 18, further comprising electronically performing at least one of the following in real time:
estimating impending food product demand in view of said prediction of said
amount of food to be ordered; and
estimating demand for each completed food product available for consumption.
20. A system for managing food supply in real time comprising:
a plurality of sensors placed inside and in the vicinity of a food outlet, wherein
said plurality of sensors electronically tracks objects present inside and in
the vicinity of a food outlet to generate electrical signals containing
information about presence of food consumers inside and in the vicinity of
said food outlet; and
a computer containing a program code, which, upon execution by a processor in

said computer, causes said processor to perform the following in real time:
analyze said electrical signals to generate digital data about said food
consumers, and
predict, based on said digital data, an amount of food to be ordered by said
food consumers in a predetermined time interval immediately
following generation of said digital data, wherein at least one of
said plurality of sensors comprises a color based vision sensor.

21. The method of claim 1, wherein electronically generating said real time data includes the following:
placing a plurality of sensors inside said food outlet to generate, in real time,
information about potential food consumers inside said food outlet;
and
electronically analyzing said information in real time to generate said data about
said food consumers;
wherein at least one of said plurality of sensors is a vision based sensor.
22. The method of claim 21, wherein said vision based sensor comprises a color enabled camera.
23. The method of claim 21, wherein said vision based sensor comprises a black and white camera.
24. The method of claim 21, wherein at least one other of said plurality of sensors is one of an electrical sensor; a mechanical sensor; and a chemical sensor.
25. The method of claim 21, wherein said information includes indications of one or more of the following:
whether said potential food consumers are present inside said food outlet;
a total number of said potential food consumers inside said food outlet;
a direction of motion of one or more of said potential food consumers;

whether one or more of said potential food consumers are placing food orders;
a food ordering pattern of each of said potential food consumers that is placing a
food order;
a color or color distribution associated with each of said potential food
consumers;
how long it takes for an employee of said food outlet to receive said food order;
and
the time it takes for a consumer to move between two points inside said food
outlet.

26. The method of claim 21, wherein said information or data is aggregated across
multiple stores and communicated to a manager.

27. The method of claim 15, wherein estimating food product demand further
includes reporting food product hold times based on the time of production and the time
at which the food product is served.